TREES MAGAZINE

Weeping Form of Norway Spruce Near Lausanne, Switzerland

Wetwood Disease of Elm — *J. C. Carter*

Norway Maples In Montreal — *J. J. Dumont*

September-October, 1960 *The Journal of American Arboriculture* Vol. 20, No. 6

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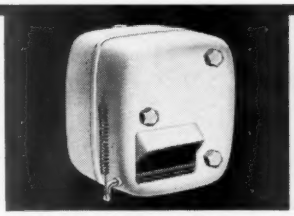

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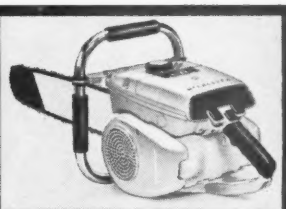

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ALONG THE WAY With .... EDW. SCANLON

(NOTE: TREES Editor Ed Scanlon left for a round-the-world trip August 16, will return October 16. Travel notes follow.)

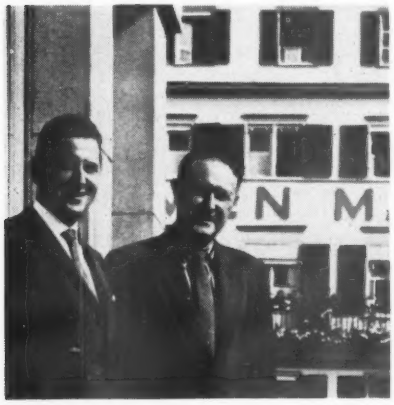
LONDON, ENGLAND: Weather looked good for pictures. On bus into London saw numerous cases of Dutch elm disease. Also on main route are stands of Aesculus brioti—Sorbus aria and European Linden. Took shots of roof garden Derry & Toms Department store. Went out to Kew.

BOSKOOP, HOLLAND: Henri den Ouden and Chris Sliyhius gave me their usual very wonderful personal conducted tours—a little rain but mostly sun and good pic weather.

ROTTERDAM, HOLLAND: Was disappointed with the American exhibit at the Floriade — looked like too much of a hurry-up, last minute affair. The petunias saved the day. The Dutch girls serving as hostesses, Ronny Haanstra and Annamarie Rienstra, were charming — and they serve good Sherry.

OUDENBUSCH, HOLLAND: Chris took me to Pete van Bom's wedding reception. Met the lovely bride and enjoyed the festivities very much. Pete grows the best trees in Holland.

ZURICH, SWITERLAND: As usual the Hotel Storchen and manager Vince Winiker were tops. Pierre Zbinden, Director of Parks placed at my disposal a young lad, Walter Frischknecht and a Landscape Architect with the department. Saw many fine streets of trees I had missed last year.



Vince Winiker and Ed Scanlon on the hotel terrace.

LAUSANNE, SWITZERLAND: The Beau Rivage Palace Hotel is the ultimate in swank. When I parked my Taunus (German Ford) among the Rolls Royces I sneaked away from it real fast. Andre Desargens, the Park Director picked me up at the hotel the following morning. This is beautiful country, located on Lake Geneva with the Alps all around. The most impressive trees tho are conifers—Sequoia gigantea and Lebanon cedar, with magnificent Mt. Atlas Blue cedar.

GENEVA, SWITZERLAND: Here planes have been pollarded by the thousands to make globes—why not use natural globes? I don't know — it doesn't make sense to me. I was disappointed generally with Geneva. It doesn't have the old world charm of Zurich.

VENICE ITALY: Here you move into an entirely new world—fascinating, fabulous and charming. I accidentally met Dr. William Millikan, former Director of the Cleveland Art Museum in the small San Moisse piazza, as I was coming out of the Baur Grumwold Hotel—we chatted a bit and he suggested I stroll over to San Marcus Square where a concert was in progress. What a magnificent sight. The church of St. Mark is a fantasy. You could gaze at the facade for hours, which I did. This place you must see—also you have no worry about the nutty hornblowing European drivers.

FLORENCE, ITALY: In a DC 3 on Alitalia Airlines for a connection at Rome to Athens, we stopped here and as I was having a coke the pilot came up beside me. He ordered a sandwich and a bottle of Chianti—a "winebreak" no less for a pilot—brother that does it—but we made it.

ROME, ITALY: Was glad I wasn't stopping here. With the Olympic games and 100° heat here and the worst confusion I have ever seen in an aiport the place was chaotic. As we came in we flew past the Vatican and I took 3 or 4 shots —hope they come out good. The heat and confusion were rewarded tho by the hop to Athens on a French Caravelle—this is the jet with the engines on both sides of the rear of the fuselage, and what a terrific plane—also, a couple seats ahead of me was Elizabeth Taylor, going to Athens for the opening of a picture. She's better on the screen.

ATHENS, GREECE: It was hotter than the devil here—and dry and how anything lives here is a screaming mystery. The soil is marble and dobe and you see very few lawns, only the opulent can afford them. If you lads think you have trouble growing street trees just hop over here and you will go home feeling very good.

ISTANBUL, TURKEY: This place is a little better, climate-wise — for trees than Athens, but poverty is inherent and outside of new areas where they are developing divided highways, the trees are pretty ratty looking. It was hotter than Billie B here also.

BEIRUT, LEBANON: Had a layover here after a wonderful Caravelle flite from Athens on Scandinavia Airlines — what a meal, and finally I found out the superb brand of Cognac I had on an SAS flite from Stockholm to Moscow three years ago—it is French Bisquit. In flying over Ankara, the capitol of Turkey the pattern of street lighting on their main boulevards stood out brilliantly. It was greenish and probably fluorescent, but it certainly made a beautiful pattern from the air. I must return to Beirut (I will—have a four-hour layover on a flite to Baghdad) to see the exotic stands of natural Stone Pine (Pinus pinea) which seemed to be all over the place. Hope I can get away from the passport people for a few hours to get some pix. I have never seen a natural stand of trees as different as these.

JERUSALEM, JORDAN: This city is inspiring of course—for its biblical foundation and because of the awesome association with the life of Christ—the Holy Sepulcher — Calvary — Gethsemane — the Via Dolorosa, or Way of the Cross. Then the exotic, aromatic and sometimes smelly bazaars within the old walled city transforms you to the never never land of the Arabian Nights. It is hot and dry, but a very exhilarating climate. This certainly is a small world. Started talking with a fellow at the American Colony Hotel here and found out that he has been a subscriber of TREES for years. He is Dr. Albert Hartzell, an entomologist at the Boyce Thompson Institute, Yonkers, New York. In the same hotel I met Senator John Sparkman of Alabama. What did we discuss? You'd never guess — it was baseball standings. Had several pictures taken alongside a fantastic old Olive tree in the Garden of Gethsemane to celebrate my 57th birthday (Sept. 5.)

ON TO BAGHDAD

FLASH!! Just received word that the Boss was "deported" from Baghdad—visa trouble—no details available.

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TREES MAGAZINE
7621 Lewis Road,
Olmsted Falls 38, Ohio

The Editors of TREES invite discussions, comments and all type of literary materials pertaining to trees and tree preservation from any person engaged either in the scientific advancement or commercial development of the field.

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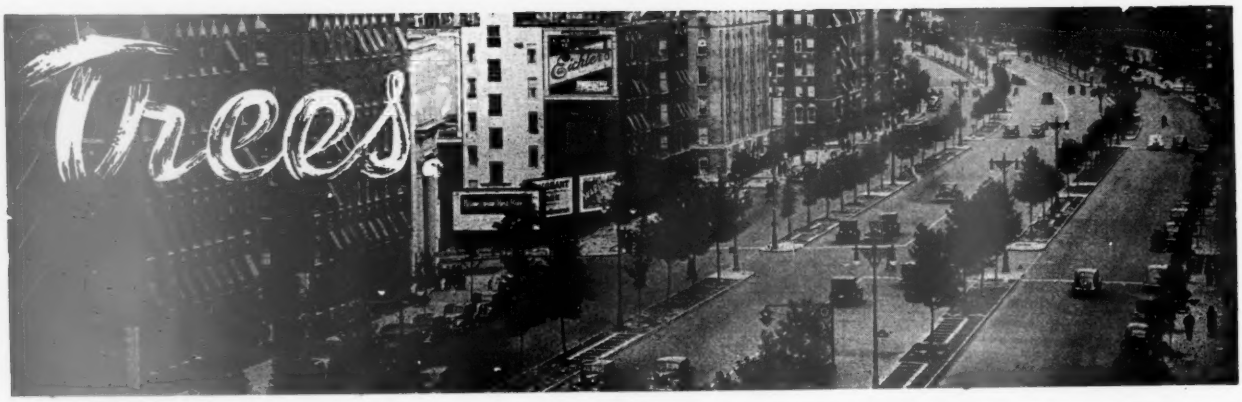
TREES Magazine is a bi-monthly Journal published at Olmsted Falls, Ohio, by Edward H. Scanlon, and is devoted to the advancement of knowledge in the aesthetic and functional uses of exotic and native ornamental trees; to the advancement of research in pathological, entomological and physical disorders of ornamental trees; and to the education of the public to the advantages and need of using trees properly, both aesthetically and functionally. TREES Magazine is dedicated to the furtherance of the technical and business administration of Trees (Street and Ornamental); and Parks (Municipal and National) in the U. S. Scanlon Publishing Co., 7621 Lewis Road, Olmsted Falls, Ohio. Subscription by mail $3.00; outside United States $3.50. Advertising rates upon inquiry. Closing date for advertising copy—10th of month preceding date of issue. Unsolicited manuscripts must be accompanied by return postage.



Sept-October, 1960 **Journal of the National Arborist Association** Vol. 20, No. 6

Edward H. Scanlon, Editor

7621 Lewis Rd., Olmsted Falls 38, Ohio ADams 5-3314

"No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; A COUNTRY WITHOUT TREES IS HOPELESS."

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Out On A Limb

VALUE OF AND NEED FOR STREET TREES IS UNIVERSAL

Tehran, Iran—It is a hot, dry still evening here in this capital city, and having just partaken of a nice dinner in the garden of the Jam Hotel, a thought that has been fermenting for a week or so rose to the surface after observing the street tree planting in Tehran.

It is a bit difficult to describe the Iranian technique. Whether it is primitive, juvenile or locally practical is difficult to say. It does not seem to have any aspect of practicality, but one thing is certain, what it lacks in ornamental qualities it makes up for in a tremendous volume of shade, and shade they definitely need here.

Take for example the street on which this hotel is situated, Ave. Takhte—Jamshid (prounounced, "Talk Tea Jarm She")—and all of the streets I have traversed in this area are the same. There is the conventional sidewalk and pavement, but in between is an open ditch, in some places 18 inches wide with cemented walls, in other places it is a sort of meandering creek about three feet wide. The trees are planted along the edges of this ditch, sometimes 2, 3, 4, 5 or 6 feet apart. I have seen none spaced any further and the species are a conglomeration of planes, black locust, mulberry, ash, globe elm (of all things), Lombardy and Carolina poplar, etc. The ditch is not a sewer but is sort of a storm drain and also takes off water from various other sources. But this is all that keeps these trees alive. Even so they are doing very poorly.

The point is tho that even here in this city that does not appear to be far removed from the dark ages, signs of which are evident everywhere, they do recognize that if they are to attain a degree of modern civilization street trees are an outstanding manifestation of that goal.

The same effort is noted in other cities in the Middle East. Istanbul has long used trees on the more prominent streets, not wisely, merely profusely. In Athens more attention has been given to spacing but the cultural problems in all of these cities are shockingly complicated. Watering is an indispensable factor otherwise the trees just would not survive, even the numerous Pepper and Chinaberry trees used in Athens. But here again we see man's inherent recognition of this one outstanding means of setting his abodes and communities aside as examples for visitors and his own neighbors to admire and be comforted by.

But again we can only reiterate our feelings expressed many times in the past thirty years, we should and must place this all important factor in city planning on a higher plane of scientific and technical management. Everywhere the principle of spacing is outrageously violated — the ultimate has been reached here in Tehran—and this factor unequivocably leads to higher costs of maintenance, and because it leads to crowding and distortion, it seriously reduces the factor of beauty and embellishment.

Even so it is gratifying to observe the recognition and value that trees along streets are afforded even where the problem of survival is reduced almost to zero.

The opportunity for improvement is unlimited and pride of accomplishment should call for taking this universally recognized factor of human betterment out of the shadows.

Officers of the National Arborist Association are shown shortly after their election in Boston recently. Left to right: Edwin E. Irish, Detroit, Mich., director; John Z. Duling, Muncie, Ind., treasurer; James T. Turner, Atlanta, Ga., immediate past president; Freeman L. Parr, Hicksville, N. Y., president; George T. Lewis, Media, Pa., first vice president; F. L. Dinsmore, St. Louis, Mo., second vice president; Winston E. Parker, Moorestown, N. J., director; and Paul E. Tilford, Wooster, Ohio, executive secretary. The mid-winter meeting of the NAA will be held in New York City sometime in January.

For Your Calendar

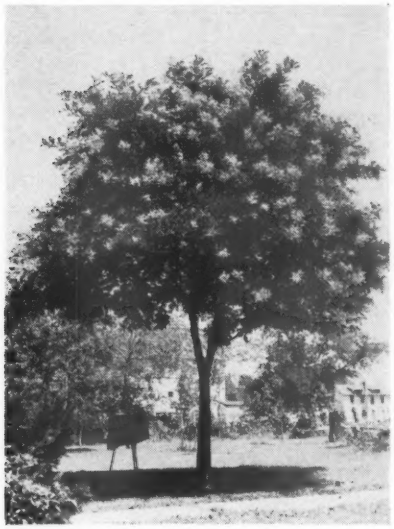
59th annual convention, Ohio Cemetery Superintendents and Officials, Commodore Perry Hotel, Toledo, Ohio, October 9, 10, 11.

85th annual meeting, American Forestry Association, Edgewater Gulf Hotel, Edgewater Park, Mississippi, October 17, 18, 19.

Ohio Recreation Association Annual Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, November 2, 3, 4.

15th Annual American Horticultural Congress, Huntington-Sheraton Hotel, Pasadena, California, November 10, 11, 12.

Plant Propagators Society, Manger Hotel, Cleveland, Ohio, December 1, 2, 3.



Sophora Japonica

I don't know when I have enjoyed a flowering tree anymore than the first real flush of flower our Sophora produced at the Rancho this summer. It started about July 24 and continued beautifully until August. The tree was planted at the Rancho May 10, 1950, has an 8" caliper, is 20' tall with a 20' spread. It was 8/10' when planted and flowered sparingly for the first time last year. A beautiful thing.

E. H. S.

BRANCHES OF THE LAW

By Howard Newcomb Morse
Counsellor at Law of the Supreme Court of the United States of America

"The Invalidity of Giving Bounties for Planting Trees"

A law of Missouri provided: "Every person planting one acre or more of prairie land within ten years after the passage of this act with any kind of forest trees except black locust, and successfully growing and cultivating the same for three years, and every person planting, protecting, and cultivating for three years one-quarter of a mile or more of forest trees upon his own land, to be set not more than one rod apart, shall be entitled to receive for fifteen years, commencing three years after said grove or line has been planted, an annual bounty of two dollars per acre for each acre so planted, and two dollars for each quarter of mile so planted, to be paid by the county. Said bounty shall not be paid any longer than said grove or line of trees is kept alive and in a growing condition."

Henry J. Deal planted, and successfully grew and cultivated, catalpa trees, in groves, on 202 acres of prairie land owned by him in Mississippi County, Missouri. The county court of Mississippi County paid Deal two installments under the statute, of $404 each, in two successive years. When he presented the demand for $404, as a third annual bounty, the third year, the court refused to audit and pay it. He then brought an action in the Circuit Court against Mississippi County to recover the third annual bounty. The court rendered judgment in favor of Mississippi County, and Deal appealed.

Mississippi County contended that the law under which Deal claimed the bounty was in direct conflict with a provision of the Constitution of Missouri. The Constitution provided: "The general assembly shall have no power to authorize any county, city, town, or township, or other political corporation or subdivision of the state, now existing, or that may be hereafter established, to lend its credit or to grant public money or thing of value in aid of or to any individual, association, or corporation whatsoever."

Every statute is presumed to be constitutional until the contrary plainly appears, and it is only when it manifestly infringes some provision of the constitution that it can be declared void. "But the statute in question," declared the Supreme Court of Missouri, "so clearly and manifestly infringes the constitutional provision quoted above that we have no hesitancy in declaring it void. It seems to be too plain for argument. It is self-evident."

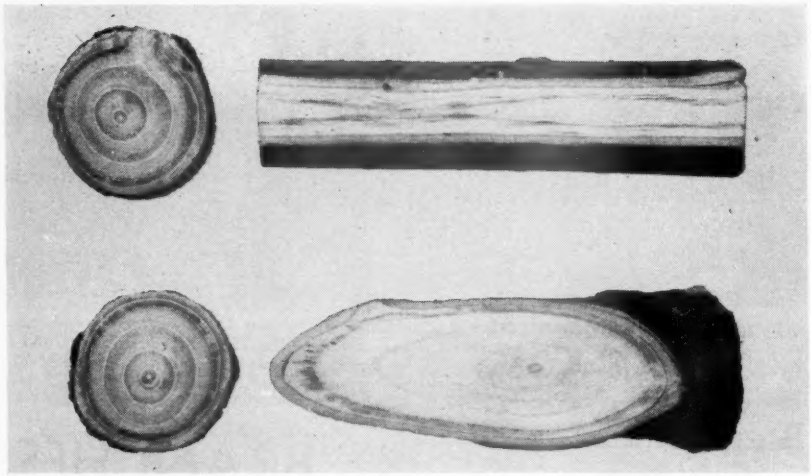
The Supreme Court found the law in conflict also with another provision of the Constitution of Missouri, which provided: "Taxes may be levied and collected for public purposes only." The Supreme Court stated: "It is not always easy to determine what a public purpose is, but here no difficulty arises. The land on which plaintiff set out the catalpa trees belonged to him, was his private property, and there is nothing in the statute to prevent him from collecting the bounty from the county, and then cutting the trees down and selling them for his private gain; and to take money collected by taxation from the people for such a purpose cannot be tolerated for a moment without a surrender of all property to the power of confiscation for private uses." Accordingly, the Supreme Court affirmed the decision of the court below.

Frank J. Pipal Dies

We were sorry to hear that Frank J. Pipal of Omaha, Nebraska died of a heart attack recently. Mr. Pipal retired as Omaha city forester in 1951, but continued his interest in good trees and tried to educate the public likewise through his weekly column in the Omaha World Herald. He was a regular tree and lawn columnist since 1940. Mr. Pipal is survived by his wife; two sons, Frank B. of Teaneck, N. J., and George H., business manager for U.P.I in London, Eng.; and six grandchildren.

Wetwood Disease Of Elm And Its Control

By Dr. J. C. Carter
Illinois Natural History Survey
Presented at 6th Annual Kansas State Shade Tree Conference, 1960.



Brown streaks produced by wetwood in the young sapwood of elms, especially in the current springwood, is easily confused with similar brown streaks produced by other wilt diseases of elm. All four pieces of elm in the photo above are of the wetwood disease.

Wetwood is one of the most common and widespread tree diseases which is perpetually plaguing the arborist. Although wetwood is primarily a disease of the heartwood and older sapwood, it has many external manifestations that are unsightly and detrimental to the appearance of the affected tree. These external manifestations include fluxing through wounds, yellowing of foliage followed by premature defoliation, scorch of foliage, wilting of foliage, dieback of wilted branches, and general decline of entire trees. Trees affected by wetwood include apple, birch, elm, fir, hemlock, maple, mulberry, oak, poplar and willow. It is more widespread and causes more injury in elm than in other trees. *Ulmus pumila* is unusually susceptible to the disease. The present discussion will deal mainly with the wetwood disease of elm and its control.

In elm, wetwood is most conspicuous in the older sapwood and heartwood. In trunk cross sections, it may appear as dark brown streaks or broken bands of discoloration in one of several wood rings, or as discoloration limited to portions of a single wood ring. The diseased wood is water-soaked, and sap oozes out when the wood is cut.

Gas is produced in large amounts in wetwood-affected tissues by the action of fermenting bacteria on carbohydrates and other materials in the sap. When this gas is confined in the trunk, abnormally high sap pressures develop. Pressures up to 60 pounds per square inch have been reported. However, pressures of only five to 10 pounds per square inch are common in many wetwood-affected trees. The gas contains approximately 46 per cent methane, 36 per cent nitrogen, 14 per cent carbon dioxide, 5 per cent oxygen, and 1 per cent hydrogen. It does not contain carbon monoxide or illuminants.

Sap accumulates under pressure in the diseased wood and produces the water-soaked condition which gives rise to the name "wetwood." This sap contains phosphorus and an abundance of potassium. These materials appear to be present in the sap as carbonates. The sap and water extract from affected wood of diseased elms are alkaline, while water extracts from healthy sapwood and heartwood of normal elms are acid in reaction. The wetwood sap has a pH of 7.11 to 8.55 and the water extract from wetwood-affected wood has a pH 7.06 to 7.80. The water extract from healthy wood has a pH of 6.11 to 6.60.

Flux.—The most conspicuous damage caused by wetwood is the bleeding or fluxing of the fermented sap through trunk wounds. However, other symptoms may develop when the fluxing sap spreads to current-season wood and is transported in the sap stream. These symptoms may develop as yellowing, scorching, and wilting of leaves, dying of branches, and general decline of entire trees.

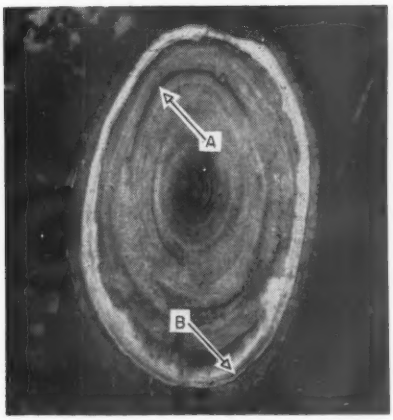
Abnormally high pressures caused by fermentation force the accumulated gas and sap out of the trunk through wounds made by the removal of branches, through cracks in crotches and trunks, and through other trunk injuries. The exuding of sap is commonly called "fluxing." The sap or flux is colorless to tan as it oozes out of diseased wood but turns dark upon exposure to air. When abundant bleeding occurs, the flux flows down the trunk, wetting and soaking large areas of bark. When the flux dries, it leaves a light gray to white incrustation on the bark. Fluxing may occur from April to December. However, it is most conspicuous during July, August, and September, when the wetwood organism is most actively fermenting sap and producing abnormal pressures in the diseased wood, Fluxing usually ceases during January, February, and March. However, the wounds through which this fermented sap has flowed can be detected by the gray to white incrustation of dry flux on the bark.

The exuding wetwood flux is toxic to the extent that it is capable of retarding or preventing callus formation, and it frequently kills the cambium at the base of a cut where a branch has been removed and around the trunk cracks through which it flows. Young shoots directly above the fluxing regions may wilt. Foliage and young shoots, and grass at the base of an affected tree, may be killed if the flux drops on them. Growth of air-borne bacteria and yeast in the fluxing sap may produce gray to brown, foam-like, ill smelling, slimy masses around wounds. This slimy material is commonly called "slime flux."

Cracks develop in the wood probably during the winter months, at times when the temperature falls rapidly to very low points. Toxic sap from the wetwood-affected heartwood oozes out through these cracks and kills the cambium for some distance around the cracks. Killing of the cambium results in the separation of the bark from the underlying wood. Cracks in the bark with flux oozing through them become apparent in June or July. Many such cracks callus over during the growing season in which they are formed. The callused-over cracks will not flux in succeeding years if the callus tissues produced are strong enough to withstand the pressure that develops in the underlying diseased wood.

Foliage Yellowing. — Leaves on some trees may droop and turn yellow but not wilt. Many leaves that turn yellow may fall prematurely during late July and August. This yellowing of foliage is not easily differentiated from yellowing which results from adverse climatic conditions. It does not result in any noticeable effect on the growth of the tree.

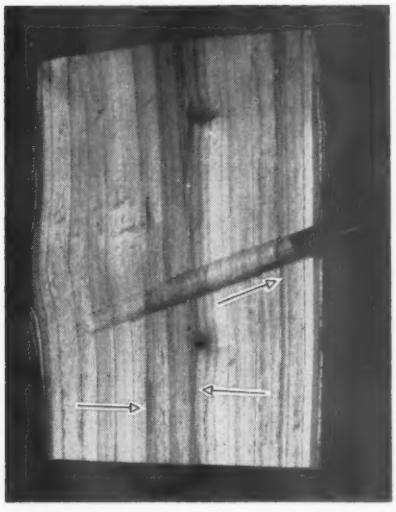
Scorch.—Foliage scorch resulting from wetwood appears as browning of tissues, usually between the veins but occasionally along the margins of leaves. These symptoms appear most frequently during late



A section of elm trunk affected with wetwood shows dark brown diseased areas in isolated portions of some wood rings as in "A" and brown streaking in part of the current-season wood ring as at "B".

July and August. Many of the scorched leaves may drop prematurely. However, scorch does not result in any noticeable effect on the growth of the tree.

Wilt.—Wilt occurs on elms affected with wetwood when sufficient quantities of the toxic sap that has accumulated in the trunk wood is carried into the branches. The sap spreads through the current-season spring wood in the branches. Leaves on the affected branches first curl upward along their margins, then the petioles become flacid, and finally the leaves droop. Curl and droop are followed by wilt. Some leaves that wilt rapidly may drop from the trees while still green. Other leaves that wilt rapidly may take on a dull, greenish-brown or somewhat bronzed appearance by the time they fall. Leaves that wilt slowly may turn yellow or brown before they fall. Many of the brown leaves may remain on the affected branches for several weeks.



This section of tree shows a drain hole bored at the proper angle to insure effective drainage and the drain pipe so inserted that it does not penetrate diseased wood (arrows) and interfere with drainage.

Foliage wilt, resulting from the toxic wetwood sap spreading into branches, has been observed on trees as large as 10 inches d.b.h., but most frequently on trees 3 to 6 inches d.b.h. Elms more than 10 inches d.b.h. affected with wetwood usually do not wilt but frequently develop yellowing and browning of the foliage followed by leaf drop and branch dieback. General decline may occur in these larger trees affected with wetwood.

Dieback and General Decline. — Conspicuous foliage wilt is freyuently followed by dying back of affected branches. This dieback may be limited to only tip portions of branches, or entire branches may die. In some trees, very few branches die during a single growing season and the trees recover in succeeding years. In others a few scattered branches die annually and the trees show gradual decline over a period of years. In large, old trees, this gradual decline may be attributed to old age when actually it is one phase of the wetwood disease.

Trees fluxing, wilting, or showing other symptoms of wetwood should be examined for wounds through which toxic sap or flux is exuding. Such wounds may be in branches or in the trunk below the affected branches. A hole bored in the branch or trunk below the wound will allow the flux to escape and will prevent further oozing of flux through the wound. A drain pipe, if properly inserted in the hole, will prevent the flux from coming in contact with the cambium and flowing over the outer surface of the bark. This treatment prevents additional toxic sap from being taken into the current season wood and should prevent additional wilt.

Many branches on which the leaves have wilted from wetwood do not die but produce a new crop of leaves later in the current growing season or during the following growing season. Since the wetwood organism is usually widespread in the trunk and older branches, pruning wilted branches will not eliminate the disease. Pruning can be delayed until the following spring, when only the dead wood should be removed. This delay in pruning frequently may prevent destroying the ornamental value of the tree. Feeding will stimulate more vigorous growth and may aid wetwood-affected trees to overcome the adverse effects of the disease.

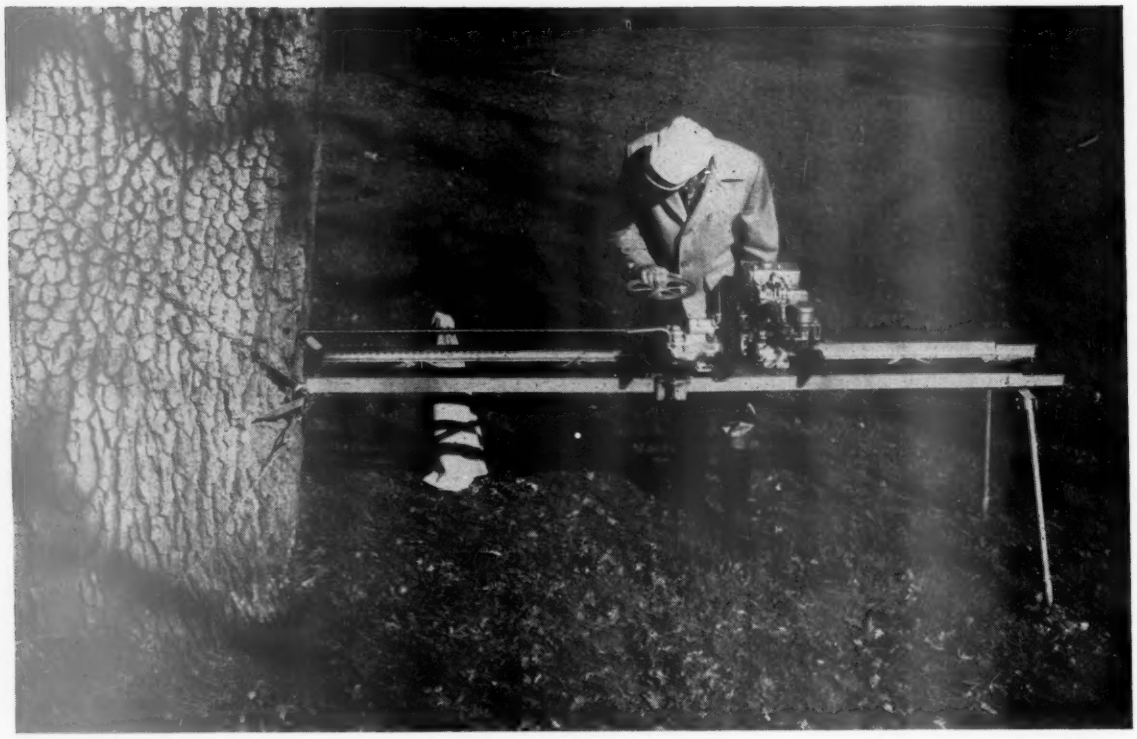
Before holes are bored in trees to correct fluxing, the source of the trouble should be determined. Fluxing and subsequent development of slime flux may arise from wounds in the bark which penetrate only to the cambial region. Such wounds may be made by insects, pruning tools, ice, wind, and lightning. Fermenting bacteria may enter through these wounds and ferment the sap in the cambial region. Fluxing from such small localized wounds will not be stopped by boring holes in the affected tree. Wounds of this type should have the diseased bark removed. The underlying wood should be disinfected and coated with wound dressing.

Wetwood sap is sufficiently toxic to retard or prevent formation of callus and to kill bark at the base of pruning wounds. Air borne bacteria, yeast, and other fungi may grow in the fluxing sap and produce gray-brown foam-like, ill-smelling, slimy masses called slime flux, as pictured.

Special care should be taken to properly drain the toxic sap from trees affected with wetwood. However, there is no hard and fast rule for determining where the drains should be installed. In some cases, a drain installed in the base of the trunk of a large elm has stopped the fluxing of several wounds along the trunk. Effective drainage of the accumulated gas and sap from the diseased wood is usually obtained by installing drains a short distance below the fluxing region. Fluxing wounds, where branches have been removed, usually can be drained by boring a hole ⅜ to ½ inch in diameter, 6 to 14 inches directly below the fluxing region. Fluxing cracks in trunks and in branch crotches may or may not respond to the same treatment. In some cases, it may be necessary to bore several holes before satisfactory drainage is obtained. The crack in the wood may not be directly behind the crack in the bark through which the sap is fluxing. These bark and wood cracks may be so located that a hole bored directly beneath the bark crack will not be directly beneath the wood crack, and effective drainage will not result. As a rule, it is best to bore the hole to one side and about 6 to 14 inches below the fluxing crack. This hole should be directed toward the probable location of the crack in the wood or toward the center of the heartwood. Drain holes should have sufficient slant to allow the wetwood sap to flow out, and they should extend through the heartwood to within a few inches of the bark on the opposite side of the trunk.

Precautions that may be taken to prevent spreading the wetwood bacterium from diseased to healthy trees should be considered. Although wetwood appears to be present in most elms it occurs only

(Continued on Page 22)



A view of the eight foot track showing center joint which enables user to pack material in four foot length. Chains and turnbuckles fasten the track to the tree and legs telescope to fit ground slopes.

Power Driven Borers Take Cores From Large Trees

By NATHAN A. BOWERS

A tree trunk honeycombed with holes, which might catch your eye in Atherton, Calif., could be mistaken for the home of a colony of woodpeckers. But on closer inspection you would see that the trunk has no branches, its base rests on a low platform and it is braced firmly against and fastened to a large oak. Moreover, the holes were *not* made by woodpeckers —too large and smooth and some go all the way through the huge trunk.

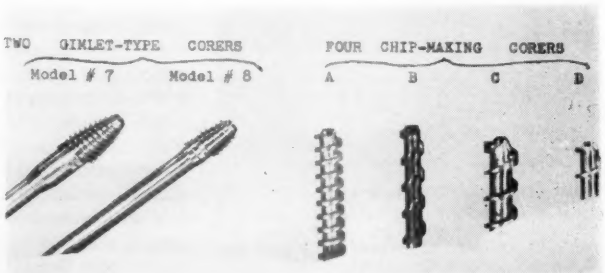
The tree trunk is a "guinea pig." In a nearby building marked "Laboratory" you would find a collection of core-boring equipment which makes use of the guinea pig as a convenient place for field trials each time a modified coring-tool design has to be tested. The tools are the first to use power-drive in taking cores which reveal, through the microscope of the dendrochronologist, intriguing secrets hidden by the trees in annual growth-rings.

In developing these tools field tests had to be made often because there were many features on which design was pioneered from the start—no precedent of any sort. Essentially the work progressed in three stages, all three repeated many times: (1) design, (2) machine work and (3) field trial. After each trial and subsequent changes to correct weaknesses or faults that developed, the three-fold cycle would be repeated.

This cut-and-try procedure prolonged the development over several years. At first, which was five years ago, progress was discouragingly slow and severe setbacks sometimes brought it to a complete stop for awhile. When this happened, it was started again only because of an underlying faith—a belief that such epuipment, somehow, someday *must* be successful. It was. A few months ago, after many refinements and finishing touches, tools were produced which successfully take long cores from either soft or hard woods.

There are two types of these coring tools; the gimlet and the chip-maker. The gimlet makes no chips and depends on deep threads in the cutting-head for worming its way through wood fibers while the circular cutting edge takes the core. This tool is fundamentally unlike the Swedish increment corer because it requires (and will not operate successfully without) two or more pairs of longitudinal knife-edges just back of the deep threads.

In the many modifications of this gimlet head, as it was developed, the idea of a joint between head and following tube



A picture of some of the cutter heads that were tried out: two gimlets at left and four chipmakers at right.

never was abandoned. These two parts of the tool require different kinds of steel and hence should be made separately and then assembled. The joint between these two parts got a lion's share of attention, and caused many of the headaches, because (1) it must be able to transmit heavy torque *in either direction* and (2) the increase in diameter occasioned by the joint must be kept to the absolute minimum.

Early endeavors produced a design which successfully took cores in the softer woods (such as redwood) but involved so much friction, due to a relatively large joint diameter (and consequently large head) that this detail had to be completely redesigned. The final result is a gimlet cutting head with the outside diameter slimmed down to 1.138 inch, as compared to the 1.325-inch head which was a minimum under the earlier designs. This difference, when expressed in figures, may seem to be a minor matter, but in reality it make an enormous difference in operation.

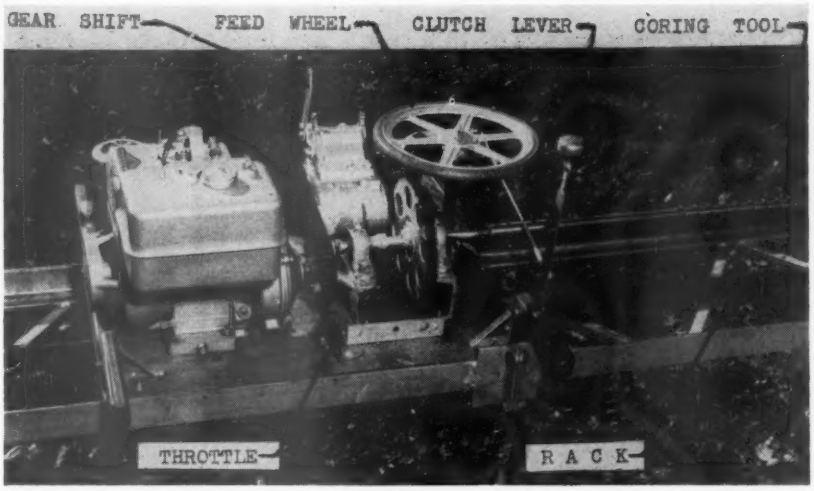
However, even with this decreased diameter, the gimlet has a disadvantage that becomes very serious when taking cores as much as six feet long—FRICTION. Especially for coring hard, dry, closegrained wood, the urgent need for some kind of a chip-making tool became increasingly apparent.

Here, again, no literature could be found. The men who were putting heads together to work out designs (later dubbed the BBT, or "Borer Brain Trust")* employed an attorney to make a patent-office search in hope of getting any ideas to be had from previous work along this line. Nothing useful was found. The only patents of record on wood-coring tools relate to the type known as "plug-cutters" — a design in no way adaptable to taking long cores.

So the BBT evolved another wholly novel design which had little in common with the gimlet other than the circular cutting edge. Behind this is a radial cutting edge at the forward end of a continuous spiral or "land" extending the full length of the tool. The function of the spiral is to pass the chips back, as the cutting edge advances, in the same way a carpenter's bit does.

In the first chip-maker the shaft was an assembly of two parts: (1) a spiral coil spring wound to order by a spring manufacturer, which was threaded into a groove in (2) a thick-walled tube. The groove, made on a lathe, was cut to fit cross-section and pitch of the spiral spring and after being put together, spring and tube were unified at both ends by brazing.

* The "Borer Brain Trust" at that time consisted of four men: Russ Osborne, Jim Allen, John Hunt and the author.



A close up of the power unit showing throttle, rack, gear shift, feed wheel, clutch lever and coring tool. The power unit is hand advanced by feed wheel—to pinion—to rack along track center line.

A later model of the chip-making type used a simpler form of construction when it was found that a tube of required inside diameter could be obtained with a very thick wall. On such a tube the outer surface was machined to form a land of the desired pitch and height as an integral part of the tube wall.

By the time this later-model chip-maker reached final form, the power plant had also gone through a succession of improvements which smoothed out control of the driving force.

Looking back on development of the power plant there is a temptation to think of it as a "Comedy of Errors." At first the idea was to use a light, chainsaw type of prime mover. Not only was this soon abandoned but when it was discovered what high torque had to be delivered at very low speed, it developed that nothing on the ready-made market even approached requirements.

After that it took some two years to bridge the gap between the rear end of the coring tool and the 2.8-hp gasoline engine. The latter has an aluminum cylinder block and a built-in 6-to-1 speed reduction gear train.

In its final form, however, the nondescript power plant shown in Fig. 2 meets all of the tough requirements. The clutch makes it possible to start boring at very low speed—just barely moving—and once the cutting head begins to take hold, the 3-speed gear shift can adjust rate of rotation to whatever operating conditions permit. The maximum of 165 rpm is rarely used except in reverse when backing out under minimum friction and torque.

Having solved the problem of joint design for the connection between cutting head and tube, it was felt that the same principle could be employed in a joint between tubes if it were desired to attach a second 6-ft. length to the rear end of the original unit. Why not, it was reasoned, get the first 6-ft. length of core, stow this in the core box with proper code markings, then attach a 6-ft. extension for another length of core, thus bringing the total depth of peneration to 12 ft.?

If and when this is accomplished, would it not then be possible to make still one more 6-ft. extension? If so, this would make the total penetration sufficient to reach to the center of even the largest sequoia gigantea.

To date, however, developmental work has completed a coring tool of only 6-ft. length. It is believed that this length will be sufficient in all but a very few, exceptional cases. And fo. those few it may be that a longer tool with a one-piece tube could be substituted for deeper peneration after the first 6-ft. length of core had been taken.

Win Parker Resigns From N. J. Bureau

Mr. Parker

Winston E. Parker of Moorestown, New Jersey, resigned as a member of the New Jersey Bureau of Tree Experts. Mr. Parker was instrumental in the establishment of the Bureau and had been a member since its inception in 1940. At the time of his resignation he was president.

Replacing Mr. Parker is James J. D'Arcy Jr., of Maple Shade, N. J. New officers of the Bureau are: Harry J. Banker of West Orange, N. J., president; Mr. D'Arcy, vice president; and George R. Moorhead of Trenton, N. J., secretary-treasurer.

Norway Maples Get Hardiness Test In Montreal Region

By J. J. DUMONT, SUPT.
Parks & Forestry Div.,
Montreal, Canada

Certain non-indigenous plants are able to give the impression for a certain length of time that they are perfectly adapted to climatic conditions in the country to which they have been introduced. It is possible even that a number of years will pass before the first traces of non-acclimatization appear; or it may take a particular winter to prove that the plant is not able to withstand the rigors of the climate to which it has been introduced although there may be strong similarities between the climatic conditions in the country of origin and the country of adoption. It is not, indeed, necessary to eliminate forthwith a plant that has betrayed the confidence reposed in it but which, through botanical and horticultural research, may be improved through the cultivation of varieties capable of standing up to the inclemencies of climate in its new home. However, in practice it is evidently very dangerous to give a priority to an imported plant without being entirely certain of its complete hardiness; if there is the least doubt, it is extremely wise to give the preference to the native plant.

During the autumn of 1956 I had the opportunity of examining the Norway maples in Notre Dame de Grace Park in the west end of Montreal and I found that 60 per cent of them were frost-bitten. At the time these trees were all of a diameter of ten inches at chest level. With these facts in mind, while conducting an investigation in all parts of Montreal during the winter 1956-57, I made a survey of all Norway maples in the city, noting their physiological condition and, of course, their diameter.

This survey enabled me to establish that trees standing in particularly favorable surroundings looked fine and healthy although showing traces of recent or past frost damage. These were mainly the trees in the west end of the city where they enjoyed a measure of shelter from their proximity to Mount Royal and from the presence of a large number of other trees with their favorable influence on climatic conditions in the locality. In the newer sections of the west end and the north end the Norway maples were in bad enough condition. Few of them had a diameter greater than five inches and almost all of them showed signs of frost-bite starting at the foot of the collar and up to the first sawn branches.

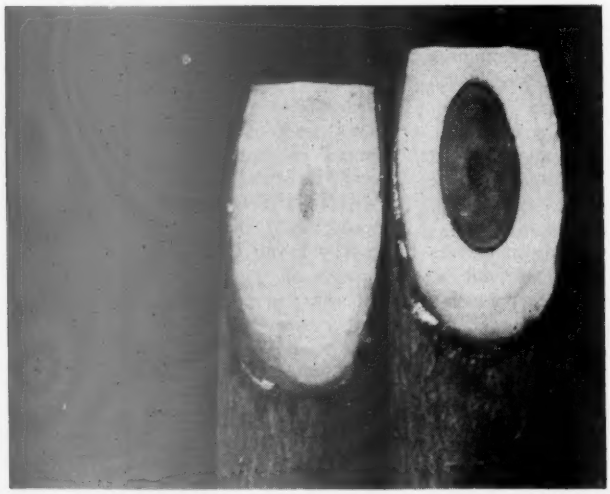
The month of May in the year 1957 was marked by several days of frost in certain sections of the Province of Quebec, even those in the warmest regions. The temperature descended below 32° F. not only at the beginning of the month but again on the 16th, 17th, 18th and 19th and even on the 21st in some places. Numerous trees in leaf were killed or damaged by these late frosts.

A trunk section of Norway Maple (Acer platanoides), one inch diameter. Frost damage (brownish coloration) is noticeable beginning at one foot above ground. All of the pictures illustrating this article were taken in July, 1957.

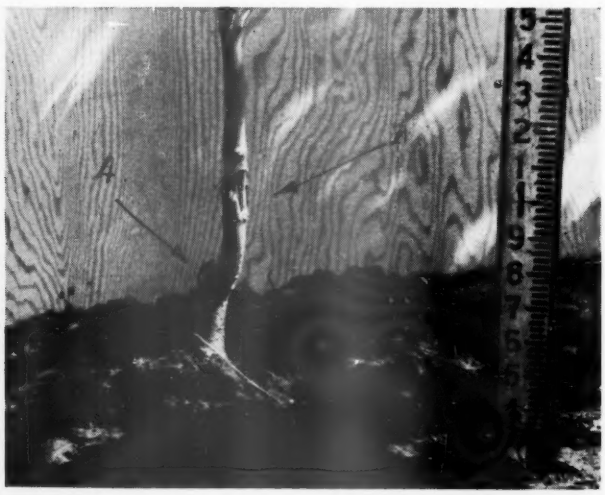
The area affected, according to the Provincial Department of Agriculture, took in most of the Province of Quebec west of Montmagny and from the Laurentians to the Ontario and United States borders. At the time the City of Montreal's municipal nursery had 53,053 Norway maples aged from one to eight years.

Towards the middle of June I established that all of these trees had their main shoot or top killed while along the trunk, especially at the collar, young shoots were emerging from the eyes and starting to develop.

On July 5th, 1957, I established that most of the trees with a diameter of one



Norway maple specimens. Note brownish coloration, frost damage. The specimen at right was cut four inches above the ground; the other, at left, was cut two feet above ground.



Norway maple. Arrow "A" shows previous cutting down caused by frost. Arrow "B" shows a typical bark crack observed during the testing period.

inch above the ground had their bark cracked or raised. I diagnosed this as a result of frostbite since a laboratory analysis failed to show the presence of the fungus *cytospora chrysosterma.*

It should be mentioned that the Montreal municipal nursery, in the east end of the city, covers an area of 50 acres and was (at that time) badly sheltered from prevailing winds. The May 1957 frosts caused the total ruin of all the Norway maples we had in the nursery.

The crown of every young tree was dead although quantities of shoots developed quickly at the foot, below the places showing evidence of frostbite. On taking sections of trunks I found a brown discoloration of the wood while the buds in some cases were brown and dying.

By the end of August and early September these woody tissues had become almost black, meriting the name "black heart" which is given generally to this ailment, especially to apple trees. This discoloration was found at all levels of the trees, starting at the point of frostbite and extending even into the small branches of the crown.

Is there a correlation between frostbite itself and black heart? It is possible. Certainly the deep frosts of the period between May 16th and 21st can be blamed for the damage that the Norway maple was found to have sustained.

It is necessary to understand that at the time when the frosts occurred, the cambium of the trees had been working; it is quite probable that the frost formed ice crystals in the intercellular meatus and in the turgid cells of the cambium, causing the destruction of the cells, and therefore, of the cambium.

Young trees with a diameter of less than six inches growing along the streets suffered enormously from the late frosts. And that is not surprising since the bark on the young trees is thinner than that on the older ones.

The Norway maple was not the only tree to sustain damage from the late frosts of May 1957. But my investigations proved that it was the one that suffered the most from those frosts. Almost every other kind of tree was able to be rehabilitated with pruning and appropriate care to become suitable for planting along the streets.

Since 1957 I have continued my research and my observations relative to this tree and rarely if ever have I encountered an Acer Platanoides that was not frostbitten; invariably the interior of the trunk was blackish brown, if not totally rotted.

In many cases after storms I have found the apparently healthy branches of Norway maples broken from the trunk at the base and there, too, I have generally found the blackish-brown core and often the state of decomposition.

The director of the Government

(Continued on Page 22)

machine: in June 1959 we purchased a Vermeer Pow-R-Stump Cutter.

Stump Removal

. . . wins public good will and adds beauty to Appleton, Wis.

By EDWIN DUSZYNSKI* Director of Public Works

Appleton, with a population of about 48,000, instituted a stump-removal program strictly as a public relations activity. During the first four months of operation, July through October 1958, we learned two things. First, if handled properly, this business of removing stumps can be accomplished quickly, satisfactorily and economically. Secondly, the results in public good will and better-appearing streets is well worth the small cost involved. Other benefits add to the program's value.

For many years the Public Works Department did offer some assistance to property owners faced with the problem of removing stumps along the parkway or boulevard strip between the street curb and sidewalk. This consisted of lifting out the stump and hauling it away after the property owner had excavated around and under the stump and cut enough of the roots for easy removal. We made no charge for this service.

Over the years many trees in the parkway had been cut down for various reasons. In most cases a chain saw had been used, with the cut made as close to the ground as possible. Only a few people undertook the task of digging out the remaining stump. Others resorted to whittling away at the stump with an axe, burning it from the top down, or drilling holes in the stump and applying chemicals to accelerate disintegration. Seldom did these methods result in a satisfactory job, and in most cases the stump was left intact to mar the appearance of the parkway.

Aldermen Investigate

In view of the interest of abutting property owners in improving the parkway strip, which is part of the street right-of-way, several aldermen felt that the city should take some action. The expenditure of city funds was justified in that the work would be on city property.

Research revealed that others had tried many types of stump removal equipment but a Vermeer stump cutter showed the most promise. On a trial basis we hired two retired city employees of an adjacent city who owned such a machine and were engaged in the stump-removal business. These men went to work on several troublesome stumps while several aldermen watched the operation. At the next budget time, these aldermen provided the impetus to include funds for the purchase of a machine: in June 1959 we purchased a Vermeer Pow-R-Stump Cutter.

[illegible] of cutting a stump ten inches below the level upon which the tires rest. A larger machine is available that will cut 18 inches below grade. With either machine the cut below actual grade can be extended by excavating around the stump to permit the machine's wheels to be placed at a lower elevation.

The unit, mounted on two pneumatic tires, consists primarily of an air-cooled gasoline engine supplying power to operate a cutting wheel and hydraulic pump. The pump provides pressure for hydraulic movement of the cutting wheel either horizontally or vertically.

We use a Willys Jeep to tow

*Mr. Duszynski has served as Director of Public Works for the City of Appleton since 1954 and prior to that held the same position in Cudahy, Wis.

Thanks, Mr. Duszynski!

Mr. Edwin Duszynski, Director of Public Works in Appleton, Wisconsin, tells of his experience with the Vermeer Pow-R-Stump Cutter in the above article from the June issue of American City Magazine. "The most economical method of stump removal I know of," is the way he describes the action of the powerful model 10 Pow-R-Stump Cutter. This is just one of hundreds of outstanding recommendations received each year from cities, parks, golf courses, cemeteries and tree service firms all over the country.

PATENTED VERMEER POW-R-STUMP CUTTER MAKES CHIPS OUT OF STUMPS IN MINUTES

You'll save hundreds of man-hours and thousands of dollars annually when you remove ugly stumps with the Pow-R-Stump Cutter. Removes any size stump in minutes. It is an easy one-man operated unit. Allows close quarter cutting to sidewalks, buildings, curbs and driveways without damage. There's ONLY ONE POW-R-STUMP CUTTER . . . ask for a FREE demonstration. (Registered under U.S. Patent No. 2912022.)

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Legal Aspects of Utility Tree Trimming

By C. Duane Aldrich
General Solicitor, N.E.T.&T. Co.

Paper presented at the Tree Wardens and Arborists and Utilities Conference, University of Massachusetts, March 24, 1960.

It is certainly not original to begin a talk like this with some historical background. However, I think that in this case, as in many others, a look at history may shed a little light on some current problems. I would like to attempt this even at the risk of re-plowing what for many of you, may be very old ground.

Perhaps it may add some point to this otherwise dull historical recital if I suggest a simple question for you to have in mind while listening. The question is this —who owns public shade trees? I will try to return later to this question, and at that time ask a second, related question—does it matter?

I'm sure that you have all been reminded many times that shade tree legislation had very early beginnings in Massachusetts. I have seen several dates mentioned, but my own research indicates that 1856 is probably the earliest significant date.

In that year the General Court passed an act authorizing city and town officials to license the planting of shade trees "wherever it may not interfere with the public travel or with private rights; and such trees" . . . the act continues ". . . shall be deemed and taken to be the private property of the person . . . so planting them, or upon whose premises they may be planted . . ." Such trees might be removed only after a complaint and finding that they constituted a nuisance. The act also provided penalties for injuring or removing such trees without right, any penalty collected to go one-half to the municipality and one-half to the "owner" as defined in the act.

From this modest beginning in 1856 we have progressed to the comprehensive statutory scheme of regulation now found in Chapter 87 of our General Laws.

First, however, let us take another look at this 1856 act. Its primary purpose seems to have been to protect shade trees along public ways from injury or removal by unauthorized persons, or under circumstances where there was no compelling public need. This is illustrated by a case which arose ten years later.

*A gentleman named Godfrey, who was superintendent of streets in Taunton, was ordered by the city council to move an engine-house to another location. En route he discovered that branches from a large elm projecting over the street blocked his way. He promptly sawed off the offending limbs and completed his move. Thereafter he was sued for damages by one Amasa White who was the owner of the abutting lot. The tree, of course, was located within the limits of the public way, and the defendant argued that White had no standing to sue for that reason.

The supreme Judicial Court, however, for reasons which are important enough to mention a little later, held that White owned the land to the center of the road, was the owner of the mutilated tree, and entitled to recover from Godfrey, who failed to observe the requirements of the 1856 act. Of this act the Court said:

"This enactment has limited in an important manner the powers of highway surveyors. Shade trees are no longer liable to be treated as a nuisance and lopped or cut down at the discretion of every such officer. They are private property, to the ornament and shelter of which the owner of an adjacent estate is entitled, and they cannot be interfered with except upon due process of law as marked out in the statute."

You will note that in this case something turned on the ownership of the land on which the tree stood. The Court's decision on this point will not surprise those of you who are familiar with the practice which has generally prevailed in New England regarding public ways. In this part of the world it is not customary for a town or city to take title, i.e. the "fee" to the land which comprises the public way. Instead, the proper public officials "lay out" the limits of the way and take a public easement for travel and the other uses associated with public passage. By now it is of course well settled that this easement includes the right to install utility facilities, but at one time this was a hotly debated issue, and many landowners sued for damages when pole lines first appeared along the highway in front of their property.

One consequence of this 'public easement' doctrine is that normally property owners have title to the center of the street adjacent to their land. This fact now has little practical significance except in those cases where there is an abandonment of the way by the municipality. However, you can see that in the mid-19th century it also had some consequences concerning who could sue for damage to trees. Indeed it still does. Back in 1867 the Massachusetts law provided that a property owner could apply to cut down a shade tree, and if the municipal officers (this was before the day of Tree Wardens) denied his request and ordered retention of the tree for ornamental or shade purposes, they must assess and pay to the property owner his damages—presumably the timber value of the trees retained.

The modern counterpart of this provision is the last sentence of No. 3 of Chapter 87—

Any person injured in his property by the action of the officers in charge of the public shade trees as to the trimming, cutting, removal or retention of any such tree, or as to the amount awarded to him for the same, may recover the damages, if any, . . . from the town under chapter 78 (i.e. the Eminent Domain chapter).

I think you see the suggestion implicit in these provisions that the adjoining property still has some kind of "ownership" in public shade trees.

I have moved ahead of my story a little here, and should add one more word about the 1856 statute and the *White* case. It is simply this. I think you can already detect in this early legislation and case the underlying rationale and objective of shade tree legislation—this is, to protect the property rights of abutting land owners, including aesthetic values, and at the same time preserve for the public the advantage of safe and convenient passage along public ways.

Of course these events occurred long before the automobile, the electric light or the telephone. By the end of the century the advent of these problems along with others had led to the enactment in 1899 of the legislation providing for municipal tree wardens and the general scheme of regulation now embodied in Chapter 87.

You will have noticed that the earlier legislation did not define what were public shade trees. This omission has been very conveniently cured in Massachusetts by including *all* trees within the limits of the highway. Those of you familiar with New Hampshire legislation, for example, will know that there the local tree wardens must designate and mark those trees which are entitled to protection as shade trees, and abutting owners are given a somewhat greater measure of direct control and rights with respect to their trimming and removal. A somewhat similar situation apparently prevails in Maine.

Let us turn again briefly to the original question—who owns public shade trees? The answer may sound to you like a typical lawyer's answer, but it is this—no one knows for sure. Prior to 1899 the legislation and cases indicate

that abutting owners doubtless would have been treated by the courts as "owners" of the public shade trees. In the more recent cases in this field, however, our Massachusetts court has expressly refrained from deciding whether the legislation enacted since 1899 has resulted in a transfer of ownership to the towns and cities.

This is an appropriate time to ask again the related question I referred to earlier —Does it matter? Here I think the answer is a little more definite. For most purposes, it doesn't matter at all who "owns" public shade trees. The statutory scheme of regulation for shade trees is now so complete that the normal attributes of ownership have lost their significance. Shade trees can now be planted, pruned or removed only in accordance with procedures regulated by law. There are only two situations which I can think of, off hand, where the matter of ownership might make a difference.

I have already mentioned abandonment of a public way. The other case which occurs to me is that in which a public shade tree has been trimmed or cut down by a tree warden after the necessary hearing, and the abutting owner claims the timber. Putting aside those cases where tree disease might require a different disposition, I suspect that most tree wardens would be only too glad to turn over the tree and thus avoid the disposal problem without raising any legal questions of ownership.

At this point it would probably be appropriate to say something regarding the powers possessed by tree wardens in this state. I hesitate to embark on this subject, only because I suspect that most of my audience are already well acquainted with the bare words of the statute, and in addition possess that wealth of practical experience which gives real meaning to the statutory formula. Probably it is sufficient to observe that the powers of tree wardens are very extensive. We know that they may appoint and remove deputy tree wardens. They have control of all public shade trees except those in parks, on state highways and on MDC boulevards, and are charged with the expenditure of all money appropriated for the planting and maintenance of such trees. Finally, they may (with the approval of the selectmen in towns) make regulations for the care and preservation of public shade trees, which after proper posting, will have the effect of law.

One thing to bear in mind is that our Court decided fairly early that a tree warden is a public officer whose duties are defined by statute, and that he is not an agent of the municipality which appoints him. This distinction is important for several reasons, one of which can be illustrated by the facts of the case in which the holding was first made. *Donohue* v. *Newburyport,* *the facts

(Continued on Page 16)

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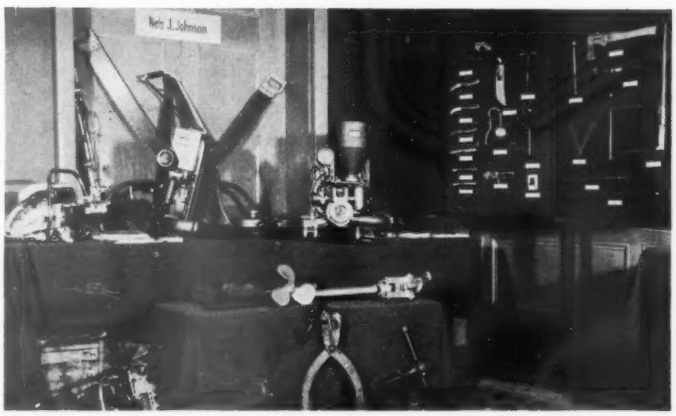

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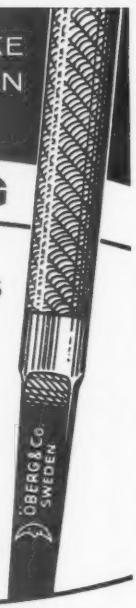

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Kalamazoo Mall Extended

It was exactly one year ago that we reported on the opening of the first permanent mall in the U. S. — in Kalamazoo, Mich.

Mall fever swept the country soon afterwards, but the other installments were only on a temporary basis. Most have since been abandoned.

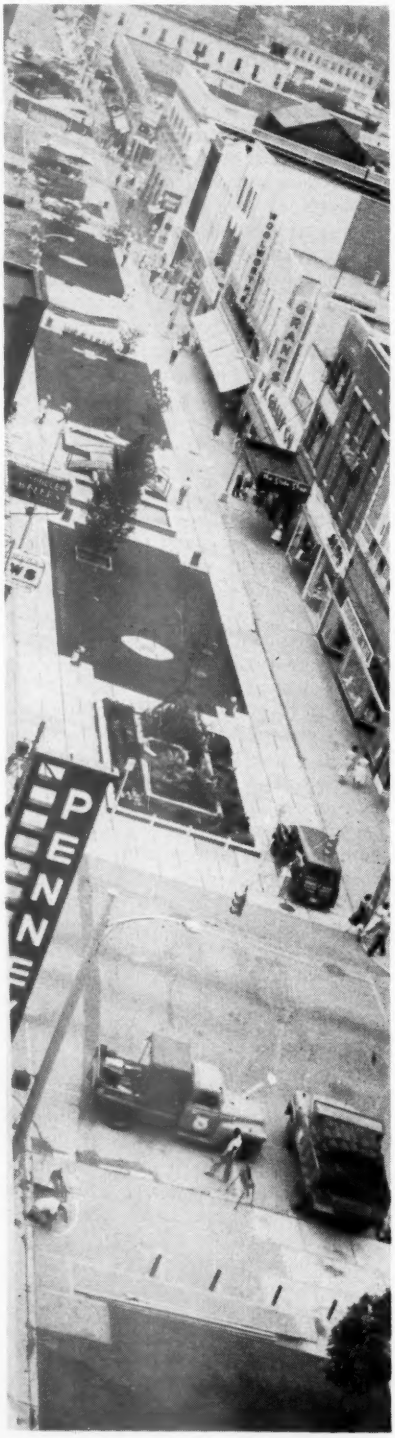
How is the mall working out in Kalamazoo? Great! While revisiting the city in early August this year, we were interested in the workmanship going into the one block extension on Burdick Street between South and Lovell. Concrete was being poured, trees planted, sod laid and a pool constructed.

There was a new $600,000 department store (Jacobson's) on the corner of the new block extension. Nicholas Kik, director of parks, said one of the primary reasons the new building was erected was that the mall was going to front the property.

The new mall section is 300 feet long, 66 feet wide and will cost approximately $25,000 to complete. The city and merchants will share the bill. Features will include a modernistic 12-foot fountain, flower beds, grass, a crimson king maple, a red maple and two columnar norway maples. As in the other sections, all concrete blocks will be colored. However, instead of putting sod in the 1½" spaces between the blocks, the park department is inserting redwood strips. The change was contributed to sod destruction by bicycle tires and women's heels.

The mall has achieved what it was designed to create—a leisurely and unhurried atmosphere. When you're in the Kalamazoo vicinity drop in at City Hall. Mr. Kik and his assistant, Bill Ver Meulen, will be pleased to show you their nature's paradise in mid-downtown.

Sod is laid in the new mall section, giving the block a green look in a few hours.



Looking down Kalamazoo's famous mall from a window in the Telephone Company office building. Part of the new section is shown in the foreground.

Tree men are shown watering and planting a good sized Crimson King maple in the new mall section.

Dr. J. C. Carter Elected NSTC President

Dr. J. C. Carter, professor of Plant Pathology at the University of Illinois and head of the section of applied botany and plant pathology at the Illinois Natural History Survey, Urbana, Ill., was elected president of the National Shade Tree Conference during the 36th annual meeting in Boston.

Also elected were: Hackett Wilson of Shelby, N. C., vice president; Dr. L. C. Chadwick, department of horticulture, Ohio State University, Columbus, Ohio, secretary-treasurer; and Dr. Paul E. Tilford, Wooster, Ohio, editor.

Approximately 700 persons attended the five day session, 112 fewer than were present at the conference in Detroit last year. Registered at the meeting were arborists, tree wardens, city arborists, park superintendents, utility and municipal executives from the U. S., Canada and Puerto Rico. The 1961 conference will be held in Minneapolis, Minn.

R. R. Rothacker Memorial

Plans are being made to establish a scholarship for students in landscape architecture at Iowa State University in memory of Professor Ralph R. Rothacker who passed away March 20, 1960. Professor Rothacker taught at the University for 38 years. At least $2,500 is needed to initiate the program. Marvin R. Springer of Dallas, Texas is the chairman. Contributions may be sent to the Alumni Achievement Fund, Room 242 Memorial Union, Iowa State University, Ames, Iowa.

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Legal Aspects of Utility Trimming

(Continued from Page 13)

were that the Newburyport tree warden had decided to cut down a large tree which had been struck by lightning a year or two before and was dead and rotten in parts. The warden had decided to take it down because he considered it dangerous to the traveling public. For two days the warden and three of his men had worked on the tree sawing off upper limbs, digging away earth at the base and cutting roots. On the third day as they were preparing to fell the tree, it toppled unexpectedly across the street, killing a 13-year-old boy who was standing on the opposite sidewalk. The boy's parents sued the city, alleging negligence by the tree warden in failing to rope off the street, or erect barriers or warning signs and also alleging a defect in the highway.

The jury returned a verdict in favor of the parents which the Supreme Judicial Court ultimately allowed to stand. However, the court said that the city was not liable for any negligence of the tree warden, because that officer was not an agent subject to the control and direction of city officials, but rather a public officer carrying out duties imposed on him by statute. The recovery *was* permitted on the theory that the city had failed in its statutory duty to keep the public way reasonably safe for passage by travelers, having had adequate notice of the dangerous and defective condition of the tree.

Thus a tree warden's negligent performance of his duties may make his city or town liable in damages. I assume that many of you know, and derive some comfort from the fact that a tree warden would not be personally liable in these cases because of the general doctrine of exoneration which protects public officers in the performance of their official duties.

Donohue v. *Newburyport* shows that a municipality may be liable for injuries to a traveler on the highway caused by trees. A later case, *Jones* v. *Great Barrington** shows that under similar circumstances it may be liable to the owner of a house which is damaged by a falling shade tree. I do not cite these cases because of any special significance they might have for utilities. Indeed, I am not aware of any case in which a utility has sued a town for damage to its plant caused by falling trees. Rather they indicate to me the extent to which the legal principles governing shade trees have been derived from, and are interwoven with the laws relating to highways and their use.

In one case our court said "The easement acquired by the public (in highways) includes every reasonable means of transportation for persons and commodities, and of transmission of intelligence, which the advance of civilization may render suitable for a highway" *(Commonwealth* v. *Morrison* 197 Mass. 199, 203). So, in a sense, we can look at the utilities as travelers on the highway. Occasionally the presence of shade trees may present an obstacle to their safe or convenient use of the highways, and the question of trimming or removal is raised. Here the tree warden's role is paramount.

As I see it he must weigh in the balance the utilities' needs for line clearance in providing good service, their desire to minimize hazards from falling limbs or trees during storms, the general public's interest in the preservation of natural aesthetic values and the particular interests of abutting property owners. If, after exercising the judgment of Solomon, he determines that trimming or removal of shade trees is required, he then has the responsibility of seeing that the necessary work is performed safely and in accordance with good tree trimming practices.

What I have been describing, of course, is the exercise of judgment and discretion by a public officer. It would be surprising, then, if occasionally differences of opinion did not arise between utilities and tree wardens regarding these matters. As it happens, I am not aware of any problems currently involving my own company, and I hope that this is true of the industry generally. Doubtless this is a tribute to the skill and common sense of

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tree wardens generally, and a product of the sincere desire of all parties to tackle tree trimming problems in a cooperative spirit.

I think we must also recognize the extent to which changes and improvements in distribution plant have tended to alleviate the more troublesome problems. For example, the increasing use of aerial cable in place of open wire for both telephone and power purposes has, as you know, drastically reduced total cross-section requirements for line clearance. This has helped to eliminate the more grotesque kinds of shade tree butchery which the older plant sometimes required. Aerial construction is going to be with us for the foreseeable future, for many reasons, but it is true that an increasing percentage of telephone plant, at least, is being buried or located in conduit underground. Although this latter development may occassionally involve problems of interference with root structure, it does have a tendency to reduce the amount of aerial construction and related tree trimming requirements. And certainly this list of helpful developments would be incomplete without a mention of the intensive efforts now being made to improve shade tree planting practices through the selection and use of new ornamental and shade tree species and the encouragement of off-street planting.

All of these developments justify an optimistic view of our future ability to handle the problems of accommodating aerial wire and shade tree requirements in a mutually satisfactory way.

If these new materials and techniques have the beneficial results which I have suggested, we may also hope that the troublesome issues raised by severe storm damage may ultimately disappear or be resolved. I have in mind particularly the popular clamor which arose after the hurricanes of 1954. You will recall that a special legislative recess commission was appointed in this state to study the entire subject of loss of electric and telephone service during the hurricanes, and to consider the feasibility of placing all utility wires underground. Of course the commission soon determined that the total costs of such an undertaking would be staggering, both to the utilities and their customers. Neither would it completely solve the problem of service interruptions during severe storms. The commission did note that approximately 90% of all such interruptions were caused by falling trees and limbs, and the only legislation which they recommended in their 1956 report was a proposed amendment to Chapter 87 authorizing appeals to the Department of Public Utilities from the refusal of a tree warden to issue a permit for the trimming or removal of trees which interfere with lines of a public service corporation.

I personally found this recommendation somewhat surprising for two reasons. First, there was no evidence or documentation elsewhere in the Commission's report to indicate that tree wardens generally had been following an unusually restrictive policy in issuing permits. Second, there was nothing I was aware of in our own company's experience which indicated that this was a major problem. I was interested to observe that neither that bill, nor the corresponding bills recommended by the Department of Public Utilities in 1957 and 1958, was enacted.

One brief additional comment before concluding. I think most of you are aware of the fact that the telephone company, and I think most of the power companies in this area, have their tree trimming work done by independent contractors rather than by employees. These firms are obligated under their contracts to secure the necessary local permits, observe local regulations, and to follow good tree trimming practices in performing the cutting needed to meet line clearance specifications. This means that the company is insulated, to a certain extent, from the day to day, practical details of carrying out the job. I do not mean to suggest, however, that the company does not recognize its underlying responsibilities in getting such work done properly. I think we have at least the following obligations:

(1) to cooperate with tree wardens and other local officials in planning and coordinating tree trimming efforts.

(2) to select responsible and competent contractors.

(3) to furnish general supervision to see that work is being performed in accordance with the contract terms.

In all of these endeavors we must, of course, keep in mind our basic legal obligation to provide a satisfactory grade of service to all our customers at the lowest cost consistent with good standards and adequate earnings.

I think all the evidence indicates that these objectives can, and are being achieved through the exercise of intelligent cooperation between utilities and local officials and, fortunately, with very little need to refer to the law or lawyers.

---

* *White* v. *Godfrey* 97 Mass. 472.
* 211 Mass. 561.
* 268 Mass. 202.

New Marigold Named "Hawaii"

David Burpee, seed grower of Lompoc, Calif. and Philadelphia, Pa., named a new American Marigold "Hawaii" in honor of the first anniversary of Hawaii, our 50th state. Hawaii Marigold has honey-scented flowers of a rich orange color.

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CAPAC, MICHIGAN

Dr. Johannes van Overbeek, right, chief plant physiologist at the Shell Development Co. Agricultural Research Laboratory, Modesto, Calif., is shown receiving an honorary doctor's degree in agricultural science from Prof. A. Lecrenier, rector of the Institute Agromique de l"Etat at Gembloux, Belgium. Dr. van Overbeek was formerly on the staff of the California Institute of Technology.

17 Magnolias Get the Axe

The news from Nashville, Tenn., is that the postoffice cut down 17 magnolia trees because of starlings. The postmaster said, "We tried everything to get rid of the birds. We put snakes and lizards in the trees, but that didn't work. We tried setting firecrackers off at intervals. That worked fine until the last firecrackers went off. Then the birds came back. The government decided they had to go and I agreed."

The treasurer of the National Council of State Garden Clubs, Mrs. Charles J. Sanders, said, "It's a disgrace. To cut down a magnolia tree is horrible. Isn't that just like the government?"

And we draw a simile to the problem: "If your dog has fleas—shoot it!"

(Reprinted with permission from SCAN)

Robert Everly Retires

Robert Everly, Glencoe Park Superintendent for 30 years, was honored at a farewell dinner marking his retirement. Members of the Park and School Boards voted unanimously to give Mr. Everly's name to a wildflower sanctuary in Glencoe. The sanctuary is famous to park men throughout the United States.

Mr. Everly was responsible for the creation of the Park-School concept in the United States.

In addition to this name honor, the Boards also gave Mr. Everly a camera. Mr. Everly will continue his association with the firm of McFadzean, Everly and Associates in the capacity of park and recreational design executive.

ASLA Appoints Assistant Director

David A. Reed, former news chief of the American Red Cross's Office of Publice Information in Alexandria, has been named assistant executive director of the American Society of Landscape Architects.

According to Lynn M. F. Harriss, executive director, Mr. Reed will have special responsibilities in the Society's expanding publication and public relations programs. New offices of the Society are at 2000 K St., N.W., Washington 6, D.C.

DED Conference

The 15th annual Dutch Elm Disease Conference will be held at Waltham Field Station, 240 Beaver Street, Waltham, Mass., November 3. For further information contact the Massachusetts Forest and Park Association, 47 Mount Vernon St., Boston, Mass.

Dr. Westcott Receives Medal

Dr. Cynthia Westcott, Glen Ridge, N. J., was presented the American Rose Society's highest award, the Gold Honor Medal, during the Society's 61st Annual Convention in Denver, Colorado. Dr. Westcott, known as the "plant doctor" to the gardening world, is the author of numerous books on insects, diseases and roses. She is the second woman to be so honored in the Society's 61 year history.

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Food Chains In The Woodland

The main business of living things is to stay alive, grow and multiply. To do this each species, or at least some of its members, must find the right kind of food and enough of it. Feeding is so taken for granted and is so commonplace that its importance is often overlooked.

Only green plants are able to live on raw sunlight, water and simple chemicals taken from the soil and the air. Hordes of animals, from very small kinds to very large ones, feed directly on plants. Other animals feed on these plant-eaters, thus getting their plant diet second hand. These, in turn, are preyed upon by large flesh-eaters—one living upon the other—and so it goes. This is a food chain. A great many of these food chains may start from a single plant such as a woodland tree. Furthermore, these food chans form an intricate web of interrelations between the eaters and the eaten which binds the forest community together.

To help understand how this system of checks and balances works, let us take as an example a single tree such as the Basswood, also called the Linden. This large tree with its characteristic ring of sprouts around the base is common in many of our forest preserves.

In spring the wingless females of a small moth lay clusters of eggs in crevices of the bark. These hatch into small green or gray cankerworms or inchworms which crawl up the tree and feed on the tender growing leaves, sometimes chewing most of the leaves on the basswood into ragged remnants. Dozens of migrating warblers and other insectivorous birds may be seen searching this tree for these small caterpillars. These little birds occasionally fall prey to hawks and owls, or their nests of eggs and young may be radied by squirrels which, again, may be caught unawares by a hunting fox. A large flesh-eating bird or mammal is usually considered to be the last link in these woodland food chains. However, aftre death by accident or from so-called "natural causes," the chain continues through the crows, opossums, fly maggots and carrion beetles which scavenge their carcasses. Fnally, all of them contribute fertilizer to the soil that helps support our basswood tree. The food chain has gone full circle.

Many other chains, including many other insect chains, start from the leaves and buds. A man lost in the woods in winter can survive on a diet of the plump, reddish brown, rather tastless b u d s. When food is scarce these also are eaten by squirrels and certain birds. Deer browse on the leaves, twigs and buds of the lower branches. In autumn after the leaves have fallen, bacteria, fungi and a wide variety of small animals begin the process of converting them into leaf mold. As they crumble, earthworms pull the fragments down into their burrows where they are eaten and the digested remains stirred into the soil.

The fragrant, creamy yellow clusters of flowers in early summer buzz with honyebees and bumble bees collecting nectar and pollen for their colonies. Honeybee hives in hollow trees are often robbed by raccoons, while skunks devour bumble bee nests on the ground—honey, young, adults and all. Our grandmothers dried basswood blossoms to make a tonic tea.

In 1973, the soil around our basswood will be peppered with holes when the 17-year cicadas burrow upward for their brief life aboveground. Since 1956 these young have been sucking juices from its roots. They leave their cast skins on the trunk, unfold their wings and set up a deafening din. Then for a few weeks every sort of woodland flesh-eater will gorge on cicada meat.

(Nature Bulletin)

The USDA Shade Tree and Ornamental Plants Laboratory moved from Columbus to Delaware, Ohio, according to a recent note from Roger U. Swingle.

Comments Wanted

We will welcome comments regarding the new USDA Plant Zone map published on the inside cover of the last issue. It was described on page 5. Let us have your evaluation of it, as compared with the Rehder interpretation (for publication).

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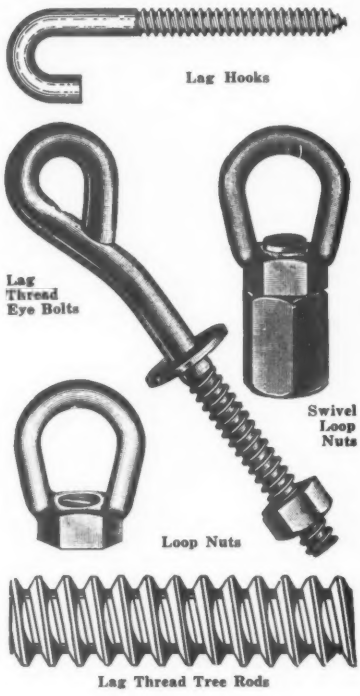

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A tree has three main parts: the roots, the trunk with its branches, and the leaves. The trunk has a dense core of heartwood that gives it strength. Surrounding that is a layer of sapwood. On the outside is a layer of bark. The bark protects the wood against attack by fungi and, most important, it protects the cambium: a microscopically thin layer of wonder-working cells between the sapwood and the bark. If a tree is "girdled" —its wood exposed by removing a band of bark around the trunk—the cambium dries and the tree dies.

The cambium enables a tree to live and grow. Each year it builds another layer of sapwood and also a layer of bark. The sapwood conducts water and dissolved nutrients, taken from the soil by the roots, up through the trunk and branches to the leaves. Food manufactured by the leaves is carried down to the trunk and roots through the spongy sieve-like inner bark. As new layers of wood and bark are added, the older growths of bark are pushed outward. They become dry and hard. Eventually they become loose and drop off.

In each species the bark on the older trees has a distinctive appearance. Even during winter, many of our hardwoods can be identified by the color of the bark and whether it is smooth, ridged, deeply furrowed, scaly, or shaggy. The beech, the paper or canoe birch, both hornbeams, the sycamore, hackberry, white oak, bur oak, black cherry, and shagbark hickory are familiar examples. On some kinds the bark is rather thin; on other, such as a bur oak, it may be 2 inches thick; on a gigantic sequoia the deeply wrinkled bark,

(Continued on Page 23)

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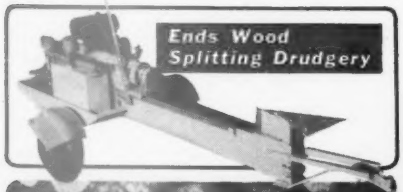

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DEALER INQUIRIES INVITED

Wetwood Disease

(Continued from Page 7)

occasionally in most other trees. The wetwood bacterium is closely related to the fireblight bacterium. Possibly the pruning procedure followed in preventing the spread of fire blight should be followed in preventing the spread of wetwood. Also, preventing trees from fluxing will prevent insects from feeding on the bacterium-infested sap and possibly carrying the bacterium to wounds on healthy trees.

Trees treated with chemical compounds should not be pronounced cured unless the wetwood organism in the treated trees has been killed. Whether a tree has been cured can be determined by laboratory tests on specimens from the water-soaked heartwood and older sapwood. Suitable samples for laboratory tests can be obtained with an increment borer. If the bacterium is still alive in the diseased wood, although fluxing has ceased, the tree has not been cured; only the fluxing has been arrested. It should be kept in mind that some wetwood-affected trees overcome fluxing by sealing the wounds with callus growth. Although there is no additional evidence of external fluxing, the bacteria are still alive in the infected wood, and the tree has not been cured of the disease.

Chairman Named

George Spalding, superintendent of the Los Angeles State and County Arboretum, has been named general chairman of the 15th annual American Horticultural Congress which will be held in Pasadena, Nov. 10-12.

Norway Maple Test

(Continued from Page 11)

Laboratory at Vollebekk College, Norway, has written me about the Acer Platanoides in these words:

"Never have I observed the destruction of all the young shoots at the crown from the cold; never found the wood destroyed by any cause other than the presence of a fungus; never found the wood assuming a dark coloration after damage caused by cold . . . the discoloration already noted among fruit trees."

In all probability the climate of the Montreal region is more rigorous than that of Norway where these trees thrive. The cause is probably the distance from the ocean and the absence of the influence of the Gulf Stream.

In conclusion, here are my findings on the Acer Platanoides, commonly known as the Norway Maple:

—It is not completely hardy for the Montreal region;

—However, under extremely favorable conditions and in as much as it has been planted from seed obtained from a select tree growing in the region, it might be considered as *relatively* hardy.

It is a pity, certainly, to put restrictions on this very beautiful tree as suitable for our streets but it appears that the Canadian climate in general and particularly that of the Island of Montreal, where temperatures change quickly, cannot be considered proper for this species which indubitably gives good results under more clement skies (Holland, Belgium, France, United States).

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Tree Bark

(Continued from Page 21)

spongy and fire resistant, frequently has a total thickness of 2 feet.

Our American Indians had some use for one or more parts of almost every plant, including the bark of trees and shrubs. Sheets of bark peeled from the paper birch were used to cover Ojibwe wigwams and canoes.

Cork, an extremely light, buoyant substance which has many important uses, is obtained in Portugal from the outer bark of the Mediterrania cork oak. During World War II, the bark of Douglas fir was found to be valuable for many purposes and is no longer wasted. The thick shaggy bark of our California redwoods is now utilized as material for insulation, floor cleaners, and as a substitute for wool in fabrics.

The bark of a tree has been transposed into clinks of the almighty dollar.

(Nature Bulletin)

Conference Opens In Melbourne

The Shade Tree Conference 1960, sponsored by the Royal Horticultural Society of Victoria, Australia, officially opened October 3 with an exhibition of Australian wild flowers, rhododendrons and trees in Melbourne.

The Conference, which will be in progress through October 9, is headed by Theodore H. Brunn, president of the sponsoring society, and Gratton R. Gould, secretary.

Mr. Brunn

Mr. Gould

Program highlights include visits to the Royal Botanic Gardens, Dandenong Ranges, Flinthill and Mount Macedon.

Edward H. Scanlon, editor of TREES, will speak at a luncheon of the Park Administration and Nurserymen and Seedsmen's Association; at a public meeting at the University of Melbourne; and at a symposium at the Royal Botanic Gardens of Melbourne. He will be joined in the symposium by two other speakers, Mr. J. S. Owens and Prof. J. S. Turner.

Al Meserve Resigns

Al Meserve, of Danbury, Conn., recently resigned from the city's Park Board and Town Recreation Commission.

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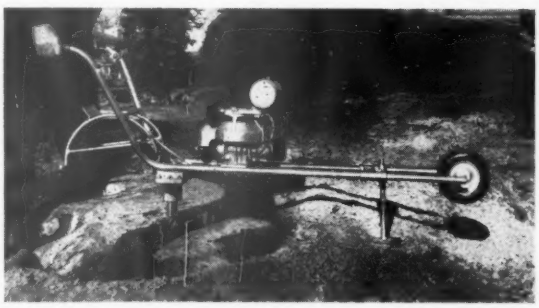

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The tubular frame slides easily through sleeve-guides on a universal joint supported by a heavy stake, which is driven into the ground to any required stump removal depths. **The cutter-head functions from side to side or forward or backward on the horizontal plane rather than unevenly.**

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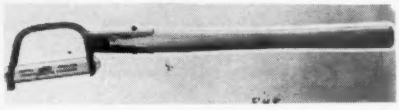
The lightweight Rowco Brushking, with swivel-mounted engine readily trims overhead, as the photo shows. Brush clearance, tree trimming, limbing, and the maintenance of wooded areas is a task handled capably by the Brushking Portable Power Brushcutter, a product of the Rowco Manufacturing Co., Inc., Keene, N. H. The Rowco Brushking has a 10″ blade operating at a speed of 18,500 surface feet per minute. Cuts all brush, saplings and trees up to 9″ dia. and can shear a path through thick undergrowth as fast as its operator can walk. The shatterproof blade will not chip even in contact with rock or steel.

* * * *

A new full line of Homelite chain saws has been announced by R. P. Straetz, sales manager of Homelite, a division of Textron Inc., Port Chester, N. Y. Each of the new saws has a larger piston and cylinder which results in a more powerful engine. Among new features are: "Plastisol" ends on the air filter which seals the filter against debris; an all position diaphragm carburetor; automatic clutch; and simple piston pump oiling. The full line includes eight chain saws, from the economy model "500" to the 900 G for felling trees up to 10 feet in diameter. The "500" pictured weighs only 79 pounds. (less bar and chain) and fells trees up to three feet in diameter.

* * * *



This is the new Sandvik No. 1 Bush Axe which weighs only one pound 14 ounces complete and is 28″ long. The charcoal steel blade can be resharpened periodically, but can also be replaced for only $1.00. For further information write Sandvik Steel, Inc., Saw & Tool Div., 1702 Nevins Rd., Fair Lawn, N. J.

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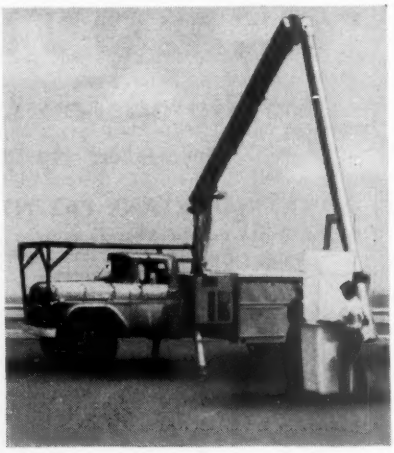

Users of aerial devices will be interested in a polyethylene basket liner recently developed by the Asplundh Chipper Co. The liner, in addition to giving the user positive dielectric safety, can be removed and tested while the lift remains in continuous use. An important feature is the elimination of the need to dump the basket because of water accumulation. You simply remove the liner. Insertion is simple and quickly performed without the need for any tool. For additional information write the Asplundh Chipper Co., 505 York Rd., Jenkintown, Pa.

* * * *

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CLYDE ROBIN,
Carmel Valley, California

HELP!

We have received an urgent request for back issues of TREES, July-August 1956, Vol. 16, No. 5. Unfortunately we do not have reserve copies. If you have a spare to send, we will extend your subscription one issue.

—Trees Magazine

Mistletoe On Trees

Mistletoe is a parasitic plant, taking some of its food from the tree upon which it grows by means of specialized roots called haustoria. The leaves and stems, however, contain chlorophyll, as evidenced by their green color. Therefore, the mistletoe probably manufactures at least a small part of its own food in addition to that taken from its host.

Mistletoe was once fairly common in southern Ohio, particularly in the counties along the Ohio River, but is now rather rare. Most of the sprigs sold here are imported from the south and southwest, where it forms huge clusters in deciduous trees. It normally does no appreciable damage to these trees.

There are many kinds of mistletoe, same growing even in the western deserts on scrub oak and mesquite, where its berries form a major food and water supply for many birds of that region.

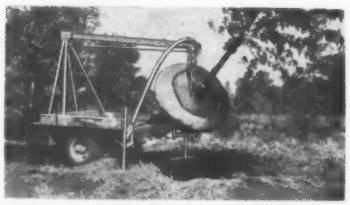
Mistletoe is a plant steeped in superstition from the days of the early Celts. The Druids held it to be a sacred plant, second only to the oak upon which it grew. Norse mythology connects it with the death of the god, Balder, son of Odin. He was protected from harm by anything on earth or in the sky, except for mistletoe, which could harm him and was used by trickery to cause his death.

The ancient writer, Pliny, tells us that mistletoe growing on an oak was highly esteemed as medicine by the Greeks, being most effective if gathered, without the use of iron, on the 'First Day of the Moon" and never being permitted to touch the ground. Thus, it was usually cut with a gold blade. The modern Ainu people of Japan believe mistletoe good medicine for almost every disease and also that it has the power to make gardens bear plentifully. The leaves are cut up, prayed over, and then sown with other seeds.

In certain parts of Switzerland mistletoe could not be shot down with a gun nor knocked down with stones. On the third or fourth day of the new moon it was shot down with an arrow and caught with the left hand, thus retaining its medicinal powers. In Sweden, however, it had to be shot down or knocked down with stones to be useful.

Mistletoe was supposed to have formed when lightning struck a tree and was, therefore, supposed to protect against lightning. It also was used for protection against witchcraft and sorcery in many parts of the world.

When mistletoe is broken from its host it withers and turns yellow and this, with its many other superstitious beliefs, has led some to think it connected in some way with gold. So we find divining rods made of mistletoe which, when placed on the ground after sundown, directly over a gold deposit or other treasure, are supposed to move up and down.



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Authors and Books

The books reviewed on this page may be ordered from TREES Magazine, 7621 Lewis Road, Olmsted Falls 38, Ohio.

DR. J. C. CARTER

Author of

"Wetwood Disease of Elm and Its Control"

Page 6

Dr. Carter, Professor of Plant Pathology at the University of Illinois, is also head of the section of Applied Botany and Plant Pathology at the Illinois Natural History Survey, Urbana, Ill.

He received his B.S., M.S., and Ph. D. from Purdue University and joined the staff at the I.N.H.S. in 1934 as an assistant botanist.

In 1945 Dr. Carter received the N.A.A. award for his publication of "Wetwood of Elms." He has served as vice president (1947) and president (1948) of the Midwestern Chapter of the National Shade Tree Conference. He also served for six years as a member of the Board of Directors of the National Shade Tree Conference, was elected vice president of the organization in 1959, and was elected president of the NSTC in Boston this year.

Dr. Carter is the author of more than 50 articles on subjects connected with his scientific research, mainly dealing with causes and control of diseases of shade and ornamental trees.

* * * *

C. DUANE ALDRICH

Author of

"Legal Aspects of Utility Tree Trimming."

Page 12

Photo by Fabian Bachrach

Gordon King, associate professor of arboriculture at the University of Massachusetts (also a member of the Advisory Council of TREES and one of our most active "talent scouts"), sent us this speech which Mr. Aldrich presented at the Tree Wardens, Arborists and Utilities Conference in March of this year. This paper includes a wealth of information which should be of interest to tree wardens and tree companies as well as public utilities.

Mr. Aldrich graduated from Harvard College and Harvard Law School (1948). He engaged in the private practice of law in Boston until 1953 at which time he became a member of the legal department of the New England Telephone and Telegraph Co. He is a member of the Massachusetts and American Bar Associations and resides in Wellesley, Mass.

J. J. DUMONT

Author of

"Norway Maples Get Hardiness Test In Montreal Region."

Page 10

For a man not yet 40, Mr. Dumont has had a wide variety of experience. He was a professor of horticulture until accepting the position of director for one of the largest and most important plantations in the Belgian Congo, Hevea Brasiliensis, 12,000 acres. He stayed there five years.

Mr. Dumont began his municipal career as a landscape architect for the city of Montreal and was subsequently promoted to assistant superintendent of the Forestry and Horticulture Division and recently to the post of Superintendent.

* * * *

NATHAN A. BOWERS

Author of

"Power Driven Borers Take Cores From Large Trees."

Page 8

Dr. Bowers, widely known civil engineer, is author of the book "Cone Bearing Trees of the Pacific Coast." A new chapter in the fifth edition of this book, "Introduction to Tree-Ring Analysis," was published in the July-August, 1957, issue of TREES.

Since his retirement ten years ago, Dr. Bowers has pioneered in the development of tools used by dendrochronologists and has done extensive work in this field. At his laboratory in Atherton, Calif., he built the pilot that resulted in the establishment of the "Bowers Laboratory" at Macalester College, St. Paul, Minn. He is co-desgner of a ¼-ton machine installed this spring in the laboratory for Tree-Ring Research at Tucson, Ariz., which employs an entirely new concept in the preparation of wood specimens for microscopic study.

Prior to his retirement, Dr. Bowers followed his profession of civil engineering for more than 40 years. He is past president of both the San Francisco Engineers' Club and the San Francisco Section of the American Society of Civil Engineers. During the war he was a war correspondent with the U. S. Navy in the Pacific. He holds the first Doctor of Philosophy degree ever to be awarded by Stanford University to a civil engineer.

JAPANESE FLOWER ARANGEMENT IN A NUTSHELL, by Ellen Gordon Allen. Charles E. Tuttle Company, Rutland, Vt. 55 pgs., illus., $1.00.

This primer was written to serve as a practical handbook for the beginner and to that end the author has made directions and explanations as elementary, practical, detailed and direct to the point as possible.

Printed on glossy paper, this book is very attractive and includes a generous number of photographs and drawings (over 60) to illustrate the lessons.

Mrs. Allen studied under several famous masters of Ikebana and earned her teacher's certificate from Mr. Houn Ohara, headmaster of the Ohara School of Japanese Flower Arrangement. She was awarded another certificate by Mr. Koshi Tsujii for her studies in the formal style of flower arrangement.

* * * *

BUDGET LANDSCAPING by Carlton B. Lees. Henry Holt and Company, Inc., 383 Madison Ave., New York 17, Manhattan, N. Y. 152 pgs., illus., $3.95.

Mr. Lees, Director of the Pennsylvania Horticultural Society, formerly conducted classes in budget landscaping at Kingwood Center, Mansfield, Ohio. Many of the exciting improvements included in this book came out of his classes, but the suggestions on which they are based can be applied to every section of the country and to every size and shape of lot.

There are new ideas for dooryards, entrance plazas, car-parking convenience, split-level landscaping, side yards and color beauty. There are several before and after drawings as well as practical advice on materials and costs, instructions for outdoor measurement and a bibliography for further reading.

* * * *

THE GARDENER'S DIRECTORY by J. W. Stephenson, Doubleday & Company, Inc., Hanover House, 575 Madison Ave., New York 22, New York. 454 pgs., $3.95.

Here, at last, is an up to date book that fills an important gap in horticultural literature—a complete who-what-where and when guide that gives names and addresses of suppliers of specialized plants and products not found in general nurseries; names of horticultural reference books, periodicals and other informative materials; a calendar of horticultural events in the U. S.; a list of horticultural organizations including general, specialty, scientific and trade; and sources for horticultural information and services in the U. S.

The International Horticulture section gives the names and locations of botanical gardens, horticultural organizations, nurseries and seedsmen, and periodicals in 97 countries outside the U. S.

There is a tremendous amount of information compiled in this book and it truly deserves a place on the desk of every horticulturist.

MANUAL OF VEGETATION ANALYSIS By Stanley A. Cain and G. M. de Oliveira Castro. Harper & Brothers, Publishers, 49 East 33rd St., New York 16, N. Y. 325 pgs., $7.50.

Dr. Cain, professor of Botany at the University of Michigan, and Dr. Castro, biologist of the Oswaldo Cruz Institute, collaborated to write this manual, an aid to the study of vegetation. The manual does not present standardized procedures, but describes many widely used methods, stressing the fact that each problem must be studied by appropriate methods that can be selected or devised only in relation to the investigator's objectives and the nature of the particular plant community with which he is confronted.

Studies range from the appropriate treatment of small differences and characteristics of the composition and structure of local communities (such as a small stand of a single forest or meadow) to the largest world formation (such as a tropical rain forest).

Coverage is broad and the detail is adequate for most investigations. An extensive bibliography leads the reader to more specialized source material. Numerous tables and graphs from specific researches illustrate concepts and methods discussed.

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